

**USE OF PRESSURE SENSITIVE MEMBRANE AND SOLENOID ACTUATED**  
**VALVE FOR ELECTRONIC DISPENSE CONTROL**

**TECHNICAL FIELD**

5           This application claims the benefit of US Application serial number 60/417,720,  
filed October 10, 2002.

**BACKGROUND ART**

10           Meters for dispensing lubricants (oil, transmission fluid) and other related fluids  
(washer fluid) are well known. Such meters are manufactured by the assignee of the  
instant invention and a number of others and may simply measure the amount manually  
dispensed or may operate on a preset basis, that is, the operator enters the desired amount  
to be dispensed (e.g. five liters), opens the valve and the meter then dispenses the desired  
amount whereupon it shuts off.

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**DISCLOSURE OF THE INVENTION**

It is an object of this invention to provide a software driven method of controlling  
the dispense flow rate of lubricants.

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The instant invention replaces mechanical actuation of the valve in lubricant dispense meters to provide a software driven method of controlling the dispense of fluids. The design utilizes either a pressure sensitive membrane switch or a multi-position membrane switch in conjunction with either a multistage solenoid actuated valve, a proportional solenoid actuated valve or an on/off solenoid actuated valve to provide operator or programmed control of lubricant dispense frequency and flow rate via the meter's microprocessor.

Use of this technology in the lubrication industry allows for reliable software control of dispense which in turn permits limiting or preventing unauthorized dispense in vehicle service lubricant dispense applications. It also provides total software control of fluid dispense in automatic lubrication applications which today utilize dated timer-controlled, pressure actuated grease injector technology. This technology can be utilized in both on-board and industrial in-plant applications.

These and other objects and advantages of the invention will appear more fully from the following description made in conjunction with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views.

#### **BRIEF DESCRIPTION OF DRAWINGS**

Figure 1 shows an exploded view of the meter of the instant invention.

**BEST MODE FOR CARRYING OUT THE INVENTION**

The instant invention, generally designated 10, is shown in Figure 1. A molded plastic housing is comprised of left and right portions 12a and 12b respectively. A trigger 14 moves about a pivot 14a. Trigger plunger assembly 16 is comprised of first plunger 16a, first plunger spring 16b, second plunger 16c and second plunger spring 16d. Trigger plunger assembly 16 is arranged to contact a pressure sensitive membrane switch 18 which has generally concentric first and second contact rings 18a and 18b. In the preferred embodiment, such a switch can be obtained from Golden Valley Products of Minneapolis, Minnesota and is a multi-position membrane switch. Switch 18 may also be a pressure sensitive membrane switch.

A source of pressurized lubricant or similar fluid (the term lubricant will be used hereinafter to encompass such similar fluids) is connected to inlet fitting 20 which is in turn connected to solenoid valve 22. Solenoid valve 22 is of the type manufactured by Valcor Scientific of Springfield, NJ and in the preferred embodiment is a multistage solenoid actuated valve having three positions - off, low and high. Solenoid valve 22 may also be a proportional solenoid actuated valve or an on/off solenoid actuated valve.

A gear meter 24 is connected to the output of solenoid valve 22 and meters the flow through the assembly by virtue of a hall effect transducer 24a which counts the passage of the gear teeth and the flow associated therewith. A dispense nozzle 26 may be attached to the outlet of meter 24. A display and control assembly 28 having microprocessor control and wireless transmission circuitry is provided for operator interaction.

By separating the trigger 14 for the operator to manipulate from the solenoid valve 22, this meter assembly is uniquely suited for use in a centralized controlled lubrication dispensing system such as one might find at an auto dealer service facility. If the meter 10 is used with such a central system and electronically registered with it, the solenoid valve 5 22 will not be energized to activate until central authorization has taken place. The multi-position pressure sensitive membrane switch 18 and multi-position solenoid valve 22 allow the operator to perform most of a dispense operation at high/full flow while finishing/topping off at a slow rate. If desired, this fast finished with slow sequence may be programmed into the meter software. Alternatively, if it is desired to use the meter 10 without a central system or the central system is down, the meter 10 is fully capable of functioning as a stand-alone preset meter. When used with a pressure sensitive membrane switch and a proportional solenoid actuated valve, the meter may be a fully featherable dispensing device.

It is contemplated that various changes and modifications may be made to 15 the meter without departing from the spirit and scope of the invention as defined by the following claims.